

DISK MAINTENANCE UTILITY (SXBX0D)
USER'S GUIDE



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**Section 1
GENERAL DESCRIPTION**

1.1 INTRODUCTION

This manual is designed to serve as a guide for those using the Emulex disk maintenance utility, SXBXOD, on Digital Equipment Corporation (DEC) PDP-11 and LSI-11 computers.

This utility is designed for use by qualified installers of Emulex equipment, and thus it assumes that the user has some knowledge of hardware configurations, PDP-11/LSI-11 architecture and terminology, and interpretation of error messages and device register contents.

This document contains two main sections and ten subsections, the contents of which are described briefly below.

- | | |
|-----------|---|
| Section 1 | General Description: This section contains an overview of the Emulex disk maintenance utility, SXBXOD, including its functions, distribution media, hardware and software compatibility, and related documentation. |
| Section 2 | Operation: Describes operation of SXBXOD, including load and start procedures, diagnostic tests, and commands. |

1.2 PRODUCT OVERVIEW

The SXBXOD utility is intended for use as a tool to make a new disk ready to contain data, or to maintain the integrity of disks that are already in use.

1.3 DISTRIBUTION MEDIA

The following table lists and describes distribution media for SXBXOD.

Related Documentation

Table 1-1. Distribution Media

Emulex P/N	Description
PX9960305	Nine-track magtape, 800 bpi
PX9960306	Nine-track magtape, 1600 bpi
PX9960307	Nine-track magtape, 1600 bpi
PX9960418	0.25-inch cartridge tape, MS boot
PX9960413	Iomega cartridge, DL boot
PX9960420	Iomega cartridge, DU boot

1.4 COMPATIBILITY

1.4.1 HARDWARE

SXBXOD is compatible with the DEC PDP-11 and LSI-11 series of computers. It supports RM02, RM03, RM05, RM80, RP04, RP05, and RP06 emulations only, including the following Emulex disk controllers:

SC03/BX
SC21/B
SC31/BX
SC72/BX

1.4.2 SOFTWARE

SXBXOD is a stand-alone utility that requires no external monitor to run. It is designed to load under the DEC XXDP+ diagnostic operating system.

1.5 RELATED DOCUMENTATION

The Emulex documents referenced in this subsection may be ordered from the following address:

Emulex Corporation
3545 Harbor Blvd.
Costa Mesa, CA 92626
(714) 662-5600 TWX 910-595-2521

Title: SC03/BX RM03/RM05/RM80/RP04/RP05/RP06 Compatible
Disk Controller Technical Manual
Publication Number: SC0351002

1-2 General Description

Related Documentation

Title: SC21/B1 SC21/V1 SC21/BE SC21/BM (RM02/RM03/RM05
Compatible) Disk Controller Technical Manual
Publication Number: SC2151001

Title: SC21/B2 (RP06 Compatible) Disk Controller
Technical Manual
Publication Number: SC2151002

Title: SC31/BX (RM02/RM03/RM05/RM80, RP06 Compatible)
Disk Controller Technical Manual
Publication Number: SC3151001

Title: SC72/BX Disk Controller Technical Manual (4 and
8 Port Versions)
Publication Number: SC7251002

The following publication can be ordered from DEC:

Title: XXDP+ System User's Manual
Publication Number: AC-F348C-MC
Publisher: Digital Equipment Corporation
Maynard, MA 01754
(617) 897-5111

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2.1 OVERVIEW

This section describes SXBXOD load and start procedures, and defines the tests and commands available with SXBXOD.

2.2 CONVENTIONS AND ABBREVIATIONS

User input appears in **bold type**, to distinguish it from general text, operating system prompts, and program output. Explanatory comments embedded in program output are enclosed by [brackets].

The carriage return key is designated **<return>**, and the control key is designated **<ctrl>**; for example, **<ctrl-c>** means that the control key and the C character key are to be pressed simultaneously. The abbreviations DEC and OCT, as used in prompts, refer to decimal and octal radix respectively.

The default response to any prompt is the response enclosed in parentheses. This is the option that is executed if the user enters only **<return>**.

2.3 LOAD AND START PROCEDURES

Mount and boot the tape, using the correct procedure for your system. After the XXDP+ prompt appears on the screen, load and run the program:

R SXBX0D<return>

A display similar to the following will appear on the screen:

Test Sections

EMULEX PDP-11 DISK MAINTENANCE UTILITY REVISION 1.0 OCT 11, 1984

CONTROLLER BASE ADDRESS : 176700

INTERRUPT VECTOR : 000254

DRIVE LUN	DRIVE TYPE	DRIVE STATUS	SECTORS/ TRACK	TRACKS/ CYLINDER	CYLINDERS/ PACK
0	RP06	ONLINE	22	19	815
1					
2	RP06	ONLINE	22	19	815
3					
4					
5					
6					
7					

DO YOU WANT HELP Y or (N) ?

The default response to the help prompt is **N<return>** (no), as indicated by the parentheses. Enter **Y<return>** if you need to refresh your memory on any commands (see also subsection 2.5).

Before beginning program execution, you will use the commands listed in subsection 2.5 to specify various parameters. For example, the **CD** command is used to select drive numbers, test sections, and the number of passes to be run; the **CA** command is used if you wish to specify non-standard values for the CSR and/or interrupt vector.

After you have entered this information, use the **SP** (Start Program) command to start the program:

SP<return>

2.4 TEST SECTIONS

The **SXBX0D** utility has five test sections: Format, Verify, Readall, Manual Update, and Display. These sections are described in the following paragraphs. The operator selects test sections by means of the **CD**, **MU**, and **DB** commands, as explained in subsection 2.5.

2.4.1 FORMAT

The Format section of this program invokes the firmware format feature of the controller to write sector header information on the entire logical unit specified. All data fields are written with zeros.

CAUTION

Because the format is handled internally by the firmware and is not under control of the program, aborting the program during this section may cause writing at the end of the pack, resulting in the loss of any bad sector data that existed before the format began. Firmware format does not produce any bad sector information or file(s); therefore, the disk will not be usable by some operating systems unless format is followed by a Verify operation.

2.4.2 VERIFY

The Verify section of this program writes data patterns over the surface of the entire logical unit, and then verifies that the data can be read correctly. Any failures are recorded in the bad sector file, which is written at the end of the pack for use by the operating system.

The data patterns that are used for this purpose are user selectable. After you enter the **CD** command and argument list (see subsection 2.5), the program asks you to enter a 16-bit mask (in octal radix). Each bit of the mask corresponds to one of 16 possible data patterns: bit 0 corresponds to data pattern 0, bit 1 selects data pattern 1, and so on. Thus the default mask, 17 octal, selects patterns 0 through 3. The default mask should be useful in detecting most of the bad spots on the disk.

Table 2-1 lists the 16 data patterns.

Test Sections

Table 2-1. Verification Data Patterns

Pat-7	Pat-6	Pat-5	Pat-4	Pat-3	Pat-2	Pat-1	Pat-0
000000	000000	177776	000001	177777	133333	165555	000000
010421	000000	177774	000003	177777	165555	133333	000000
021042	000000	177770	000007	177777	133333	165555	000000
031463	177777	177760	000017	177777	165555	133333	000000
042104	177777	177740	000037	177777	133333	165555	000000
052525	177777	177700	000077	177777	165555	133333	000000
063146	000000	177600	000177	177777	133333	165555	000000
073567	000000	177400	000377	177777	165555	133333	000000
104210	177777	177000	000777	177777	133333	165555	000000
114631	177777	176000	001777	177777	165555	133333	000000
125252	000000	174000	003777	177777	133333	165555	000000
135673	177777	170000	007777	177777	165555	133333	000000
146314	000000	160000	017777	177777	133333	165555	000000
156735	177777	140000	037777	177777	165555	133333	000000
167356	177777	100000	077777	177777	133333	165555	000000
177777	000000	000000	177777	177777	165555	133333	000000
Pat-15	Pat-14	Pat-13	Pat-12	Pat-11	Pat-10	Pat-9	Pat-8
077777	172666	177776	000001	077577	026455	007417	052525
137777	155555	177775	000002	077577	026455	007417	052525
157777	172666	177773	000004	077577	026455	007417	052525
167777	155555	177767	000010	077577	151322	170360	125252
173777	172666	177757	000020	077577	151322	170360	125252
175777	155555	177737	000040	077577	151322	170360	125252
176777	172666	177677	000100	077577	026455	007417	052525
177377	155555	177577	000200	077577	026455	007417	052525
177577	172666	177377	000400	077577	151322	170360	125252
177677	155555	176777	001000	077577	151322	170360	125252
177737	172666	175777	002000	077577	026455	007417	052525
177757	155555	173777	004000	077577	151322	170360	125252
177767	172666	167777	010000	077577	026455	007417	052525
177773	155555	157777	020000	077577	151322	170360	125252
177775	172666	137777	040000	077577	151322	170360	125252
177776	155555	077777	100000	077577	026455	007417	052525

2.4.3 READALL

The Readall section of this program performs a read operation on the entire surface of the logical unit, checking for errors as it progresses. If an error is detected, the program examines the bad sector file to see if the sector in question is already recorded as a bad spot. If not, an error is added to the cumulative total and is displayed as part of the test summary.

2.4.4 MANUAL UPDATE

The Manual Update section allows the user to add and/or delete entries in the bad and/or skipped sector files. See the **MU** command, subsection 2.5.

CAUTION

The Manual Update section must be used with caution, and only by those who are very familiar with the location and structure of the bad sector data; otherwise, the integrity of the disk will be jeopardized.

2.4.5 DISPLAY

The Display section allows the user to examine the contents of the bad sector files (see **DB** command, subsection 2.5). The number of bad spots is displayed, and their locations are displayed in both logical and physical formats. In the following example of the bad sector display, **MDBSF** stands for manufacturer detected bad sector file and **SDBSF** signifies software detected bad sector file.

** BAD SECTOR FILE DISPLAY UTILITY **

UNIT 0, SERIAL NO. 12345

MDBSF CONTAINS 1 ENTRY :

LOGICAL BLOCK	CYL	TRK	SEC
441	1	1	1

SDBSF IS EMPTY

2.5 COMMANDS

This subsection lists all the commands available with **SXBX0D**, explains the command functions, and gives examples of the correct command formats.

CA Change Base Address and/or Interrupt Vector

Format: **CA**<return>

Use this command to tell the program to use controller non-standard value(s) for the CSR and/or interrupt vector. You will be prompted for the new value(s).

Commands

CD Configure Drive(s)

Format: **CD 1,2,4, . . . n<return>**

where each element in the argument list represents a drive number (valid range, 0-7). For each drive listed, the program may then prompt for the sections of the utility to be executed, the number of times they should be executed, and other information; enter the appropriate responses. Error messages are output for certain exception conditions:

Invalid command, No drive specified [user entered CD command with no arguments]

x is an invalid unit no. [x was not in the range 0-7]

Unit: x is unavailable for testing [the specified drive did not respond properly]

If no exception condition exists, the program displays information and prompts similar to the following. Sample user input appears in **bold** type.

Unit: x
Drive type RM03 (823 Cylinders, 5 Tracks, 32 Sectors)

Format the drive Y or (N)? **Y<return>**

Enter no. of VERIFY passes to execute [DEC - 0,10,1]?
2<return>

Select pattern(s) for surface verify [OCT - 0,17777,17]? **17777<return>**

Enter no. of READALL passes to execute [DEC - 0,100,0]?
1<return>

In the preceding example, the user has requested two Verify passes, using all 16 data patterns (see Table 2-1), and one Readall pass.

Later, after the program determines whether any bad sector information exists on the pack, the user is given the option to initialize the data if the following conditions are true:

- The Format option was selected
- The pack contains bad sector information

The prompt is as follows:

Want to init bad sector data Y or (N)? **Y<return>**

Once the **CD** command has been entered and appropriate responses have been given, use the **SP** command (described later in this subsection) to start execution of the test section(s) that have been configured.

TC Display Test Configuration

Format: **TC<return>**

Use this command to display the test sequence that was configured with the **CD** command, in order to confirm that it is correct. An example of the display follows:

UNIT	TYPE	SERIAL	FORMAT	VERIFY	READALL	PATTERNS	INIT	BSF
0	RP06	12345	YES	000001	000002	000077		YES

This example indicates that unit 0 is an RP06 with serial number 12345; the drive will be formatted; one verify pass will be run (pattern mask 77 indicates patterns 0-5 will be used for the verification); two passes of the readall section will execute; and if any bad sector files (BSF) currently exist on the pack, they will be initialized and a fresh copy created.

DB Display Bad Sector File(s)

Format: **DB 1,2,4, . . . n<return>**

Use this command to display the contents of the bad sector file(s) for the indicated drive(s).

DC Display Controller Configuration

Format: **DC<return>**

Use this command to repeat the power-up display that identifies which drives are online (for sample display, see subsection 2.4).

Commands

DD Delete Drive From Test Sequence

Format: DD 1,2,4, . . . n<return>

Use this command to delete a drive from the test configuration table. In other words, if you had previously used the CD command to tell the program to execute certain test sections on a drive, and later decided to execute different sections (or none), you would use this command to "deconfigure" the drive. You would then use CD again to reconfigure it, if desired. This command eliminates the need to reconfigure other drives that may be configured correctly.

DS Display Software Switches

Format: DS<return>

Use this command to display the status of program control switches set with the SS command (described later in this subsection). An example of the display follows, including definitions of switch functions:

SS		DESCRIPTION								SS		DESCRIPTION							
<hr/>																			
15		NOT USED								14		NOT USED							
13		NOT USED								12		DON'T ABORT AFTER MAX ERRORS							
11		NOT USED								10		NOT USED							
09		NOT USED								08		NOT USED							
07		SELECT HEX MODE								06		NOT USED							
05		NOT USED								04		NOT USED							
03		NOT USED								02		NOT USED							
01		NOT USED								00		NOT USED							
SW	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			

SS Select Software Switches

Format: SS<return>

Use this command to set and/or clear the program control switches used to alter the functionality of the program. (The functions of the 16 software switches are defined in the sample display for the DS command.) You will be prompted for OPTION :, at which time you should enter the decimal number(s) of the switches to be affected:

OPTION : 1,5, . . . 15<return>

where each number specifies a switch. The effect is to toggle the current states of the indicated switches.

IP Initialize Program

Format: **IP**<return>

Use this command to force the program to execute a power-up sequence, to reset the hardware and internal variables, and to perform related functions.

KB Select CRT/TTY

Format: **KB**<return>

Use this command to direct output to the terminal instead of to the printer.

LP Enable Line Printer

Format: **LP**<return>

Use this command to direct output to the printer instead of to the terminal.

ME Set Maximum Errors

Format: **ME** **xxxxxx**<return>,

where **xxxxxx** is a 16-bit octal number.

Use this command to specify the number of errors the program will tolerate before aborting.

MU Manual Update Utility

Format: **MU** **x**<return>

where **x** is the logical unit number of the drive (specify only one drive at a time).

Use this command to manually add and/or delete bad spots in the bad and/or skipped sector files.

Commands

SP Start Program

Format: **SP**<return>

Use this command to begin execution of the test sequence.

TS Display the Test Summary

Format: **TS**<return>

Use this command to cause the test results to be displayed. The display looks like this:

Unit	FMT	VFY	New Spots	BH	RDA	Errs	Tot Errs	Termination
0	Yes	1	1	-	2	0	0	Normal
2	No	-	-	-	1	1	2	Normal

This example indicates that unit 0 was formatted; one verify pass ran, finding one bad spot; and readall ran twice and found no errors. No unexpected errors were encountered, and the program terminated normally.

On unit 2, one readall pass was run which detected one unknown bad spot. Two unexpected errors were detected, but the program still terminated normally.

The BH field is used when the home block (block 0) is found to be defective. In this case, the pack should not be used as a system pack.

<ctrl-c> (Press control key and C character simultaneously)

This is a special command that may be used at any time to abort execution of the test sequence and pass control to the command monitor. The resulting condition of the disk depends upon what was happening at the time the program was aborted. Results are unpredictable.